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10/523,251	08/30/2005	Heike Schluckwerder	10191/4057	1129
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KENYON & KENYON LLP			HEVEY, JOHN A	
ONE BROADWAY			ART UNIT	
NEW YORK, NY 10004			PAPER NUMBER	
			1709	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@kenyon.com

Office Action Summary

Application No.

10/523,251

Applicant(s)

SCHLUCKWERDER ET AL.

Examiner

John A. Hevey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>1/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

1. Claims 15-36 are pending and presented for examination. Claims 1-14 are cancelled.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/DE03/01034, filed on 3/28/03.

Information Disclosure Statement

3. The listing of references in the Search Report is not considered to be an information disclosure statement (IDS) complying with 37 CFR 1.98. 37 CFR 1.98(a)(2) requires a legible copy of: (1) each foreign patent; (2) each publication or that portion which caused it to be listed; (3) for each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion, unless the cited pending U.S. application is stored in the Image File Wrapper (IFW) system; and (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all patents, publications, applications, or other information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I. states, "the list ... must be submitted on a separate paper." Therefore, the references Hyde et al. and "Announcement", Technische Rundschau cited in the Search Report have not been considered. Applicant

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is advised that the date of submission of any item of information or any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the IDS, including all "statement" requirements of 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 15 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 15, "from place to place" is a colloquialism and renders the claim indefinite.

In claim 32, "further compound" is vague and renders the claim indefinite. The term "compound" is not defined by the claim or the specification, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 15, 24-25, and 28 rejected under 35 U.S.C. 102(b) as being anticipated by Ayako et al. (Japanese Pub. No. 11-292616).

A machine-generated translation of Ayako et al. accompanies this action. In reciting this rejection, the examiner will cite this translation.

In regards to claim 1, the instant claim is drawn to a glass-ceramic material comprising a matrix and ceramic filler, wherein the matrix contains lithium, silicon, aluminum, and oxygen. Ayako et al. teaches a glass-ceramic composition which comprises a filler and a glass matrix comprising SiO₂, Al₂O₃, Li₂O, as well as P₂O₅, MgO, ZnO, CaO, BaO, and TiO₂ (see claim 1).

In regards to claim 24, Ayako teaches that the material includes beta-spodumene and/or beta-quartz crystalline phase (see claim 1).

In regards to claim 25, the solubility of nitrogen is an inherent material property. As Nagata teaches a glass-ceramic with the same components, it would inherently possess this property as well.

In regards to claim 28, the heat conductivity is an inherent material property. As Nagata teaches a glass-ceramic with the same components, it would inherently possess this property as well.

8. Claims 29-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Ushifusa et al (US4821142).

Claim 29 is drawn to a ceramic foil, ceramic laminate or microhybrid comprising a glass-ceramic comprising lithium, silicon, aluminum, and oxygen. Ushifusa teaches a laminated ceramic circuit board comprised of layers of a glass-ceramic material

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comprising silicon, aluminum, lithium, and oxygen, in addition to potassium and calcium (see claim 2).

Claim 30 is drawn to a method for producing a glass ceramic composite material, ceramic foil, ceramic laminate, or microhybrid comprising the steps of:

-melting a glass having the composition seen in Table 1

Table 1

Component	Instant claims 16-17	Ushifusa
SiO ₂	20-68	20-85
Al ₂ O ₃	10-25	0-25
Li ₂ O	5-20	2-20
B ₂ O ₃	0-35	0-50
P ₂ O ₅	0-10	0-5
Sb ₂ O ₃	0-10	
ZrO ₂	0-3	0-5

-converting the glass to a powder

-mixing a ceramic filler with the glass powder

-sintering the powder mixture

Ushifusa teaches a method of producing a glass-ceramic laminate material with steps of: fusing a composition of glass powder (overlapping composition range can be found in table 1, or claim 1), quenching then pulverizing the glass to a powder, silica microspheres are added (equivalent to ceramic filler) to the glass powder, binder, plasticizer, and solvent compounds are added to the mixture, the mixture is then coated

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on a substrate, machined, laminated, then fired (equivalent to sintered)(see columns 6-7, example 1).

In regards to claim 31, Ushifusa teaches the use of 0-5% aluminum nitride in the material (see claim 1).

In regards to claim 32, Ushifusa teaches binder, plasticizer, and solvent compounds are added to the powder mixture before firing (see rejection above).

In regards to claim 33, Ushifusa teaches the powder mixture is pressed and laminated at a pressure of 25 kgf/cm² before firing (see example 1, column 7, lines 43-45).

In regards to claim 34, Ushifusa teaches the powder mixture formed into films (equivalent to foils), then laminated (see example 1, column 7).

In regards to claim 35, Ushifusa teaches the material fired at a maximum temperature of 850-960 C in air (see example 1, column 7) or in a nitrogen atmosphere (see example 2, column 9).

In regards to claim 36, Ushifusa teaches polyvinyl butryal as a binder, butylphthalyl buylglycolate as a plasticizer, and trichloroethylene, tetrachloroethylene, and n-butyl alcohol as a solvent are added to the powder mixture (see example 1, columns 6-7).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayako et al. (Japanese Pub. No. 11-292616) in view of Nagata et al. (US6514890).

Ayako teaches glass composition ranges which overlap the ranges claimed in 16-19, but differs in that it does not disclose the use of optional components of 3-33wt% B₂O₃, 2-5% P₂O₅, 1-5% Sb₂O₃, and 1-2% ZrO₂ as required by claims 20-21.

However, it would have been obvious to one of ordinary skill in the art to modify the composition taught by Ayako with the glass-ceramic composition taught by Nagata who discloses the use of said optional components in clearly overlapping ranges (see table 2). One would have been motivated to make such a modification in order to lower the melting temperature in the case of boron (see Nagata column 3, lines 27-36) or as nuclei for precipitation in the case of zirconium (see Nagata column 2, lines 51-66). A table of the requirements of the instant claims and teachings by the prior art is shown below (all in wt%):

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Table 2.

Component	Instant claims 16-17	Instant claims 18-19	Ayako (see claim 1)	Nagata (see claims 1, 4-5)
SiO ₂	20-68	48-66	50-62	65-80
Al ₂ O ₃	10-25	14-22	22-26	6.5-15
Li ₂ O	5-25	4-20	0-5	3-15
B ₂ O ₃	0-35	0-20		0-15
P ₂ O ₅	0-10	0-5	5-10	.2-5
Sb ₂ O ₃	0-10	0-5		0-5
ZrO ₂	0-3	0-2		.1-.8

The claimed ranges would have been obvious to one of ordinary skill in the art given the prior art's teachings. Nagata further teaches specific examples which sufficiently read on the instant claims (see example 2, table 2). No distinction is made between the claims 16-17 and 18-19 respectively for a 'matrix contains' or 'starting mixture contains' as no significant difference between the two is expected in the final composition from the given claims.

11. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayako et al. (Japanese Pub. No. 11-292616) as applied in claim 15 above in view of Lin et al. (US5242867).

The instant claims require the ceramic filler to be aluminum nitride with an average particle size of .1 to 10 micrometers. Ayako teaches the use of a filler with an average particle size of less than 50 micrometers (see claim 7) and also less than 5 micrometers (see paragraph [0031]). The prior art differs in that it teaches Al₂O₃, ZrO₂,

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or MgO as fillers and not the use of aluminum nitride. However, it would have been obvious to one of ordinary skill in the art to substitute the fillers taught by Ayako with aluminum nitride as taught by Lin et al who teaches the use of 20-60 wt% of aluminum nitride as a filler in a multilayer ceramic (see abstract, and table 5). One would have been motivated to make such a modification in order to control thermal expansion, reduce dielectric constant, increase mechanical strength, and thermal conductivity (see example 7, column 6).

In regards to claim 23, aluminum nitride particle have an inherent oxide surface layer, considered equivalent to the "oxygen-containing surface coating" as described by the specification of the instant application, and thus render this claim obvious.

12. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayako et al. (Japanese Pub. No. 11-292616).

The instant claims require the proportion of ceramic filler to be 25-60 vol% and 30-50 vol% respectively. Ayako et al. teaches the use of 5-70 wt% of fillers. The prior differs in that it uses weight percent instead of volume percent, however if converted it is believed that the ranges would clearly overlap. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected from the overlapping portion of the ranges taught by the reference because overlapping ranges have been held to establish prime facie obviousness. See MPEP 2144.05. Additionally, it would have been obvious to one of ordinary skill in the art at the time of the invention to select from the overlapping portions of weight percent ranges, which also overlap the volume percent ranges as recited in claim 26-27.

Conclusion


13. All claims have been rejected.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. Hevey whose telephone number is 571-270-3594. The examiner can normally be reached on Monday - Friday 7:30-AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-270-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jah



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SUPERVISORY PATENT EXAMINER